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Expedited Procedure

AFTER FINAL STATUS

PATENT

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Hiroshi YONEDA, et al.

Examiner: PIPALA, E

Serial No.: 09/444,834

Group Art Unit: 3661

Filed: November 22, 1999

For: AUTOMATIC GUIDANCE SYSTEM FOR FLIGHT VEHICLE HAVING
PARAFOIL AND NAVIGATION GUIDANCE APPARATUS FOR THE SYSTEM

RESPONSE TO FINAL OFFICE ACTION

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Reconsideration of the **Final** Office Action of June 5, 2001 is respectfully requested.

Applicants provide herewith under separate cover the certified copy of the priority application listed in the earlier filed declaration so as to complete the priority requirements under 35 U.S.C. § 119.

Reconsideration of the Office Action of June 5, 2001 based on the comments to follow is respectfully requested.

In the Office Action, claims 1-17 were rejected as being considered anticipated under 35 U.S.C. 102(b) by JP-A- 5-185993. This rejection is respectfully traversed. In the Final Office Action it is indicated that the arguments that the JP '993 reference fails to teach (i) a step of estimating wind velocity and wind direction and (ii) a method step of

determining a landing flight path based on the estimation step (and the wind velocity and wind direction estimating unit and determining unit of claim 11) were not persuasive because:

A) Applicants' background discussion on p.2, ll. 19-22 "clearly indicates that the '993 reference is indeed capable of correcting its position and attitude at all times, and "even when the influence of the wind is exerted"; and

B) Par. 0016 (of the partial translation) also teaches that the guidance device of reference '992 can quickly correct for the attitude and track on the basis of the position detected by the GPS, and the attitude sensed by the geomagnetic sensor at any time, even when the parachute is subjected to a cross wind while heading toward a drop position.

The ability of the '993 to correct for the effect of wind is not the same as having a navigation unit which estimates the wind direction and wind velocity and then takes measures to determine a flight path that takes advantage of this information to facilitate a soft landing and the avoidance of an overshoot in high wind conditions.

To help better appreciate the distinctions between the current claims and the prior art, reference is made to the Figure 15 illustration of the present application and the corresponding discussion on page 2, lines 9 - end (which encompasses the disclosure noted above in the Examiner's rejection). As indicated in line 23 on page 2 of the present application,

“since the guidance [of the JP‘993 system] is given in only correcting the traveling direction to the direction of the target descent position, there is fear that accuracy of descent will be lowered [under the influence of relatively high winds]”.

In other words, the system of JP ‘993 does not estimate the wind direction and velocity and then use that information to provide a desired flight path, it only makes repeated checks between, for example, a real time GPS location relative to the target’s location. For example, in the case shown in Figure 14, if the target point is taken as $X_o/Y_o/Z_o$ under a GPS mode, at each point represented by the designations E, the JP‘993 system asks the question: Where am I now relative to the target location $X_o/Y_o/Z_o$ and what parafoil change do I need to get to that target point?” While the wind might effect the location of the next check point, the JP ‘993 guidance system does not estimate the wind velocity and wind direction and use that information in formulating a flight path, it merely compares relative current positioning status with the desired target location. Thus, the ‘993 system is not proactive relative to the wind velocity and direction. Instead, it only looks to the relationship between a current location and the target location at repeated intervals. Because of the non-proactive nature of the JP ‘993 system it suffers from the drawback of not being able to properly land a payload under some situations. For example, in high wind conditions there may simply be not enough altitude left to accommodate a large wind induced overshoot relative to the constant drop of an airfoil having a fixed L/D ratio

A review of the referenced disclosure in the partial translation for JP ‘993 further

confirms that the JP reference is lacking the above noted estimating step (and unit).

Examples of possible estimation step techniques for determining wind velocity and direction associated with the present invention are found, for example, in the disclosure on pages 8 and 9 describing Figures 3 to 5. These techniques involve, for example, obtaining ground speed vectors V_g at different times for comparison purposes (e.g. an induced turn) to determine deviations due to the wind such that wind velocity and wind direction data can be determined. The JP '993 reference fails to disclose or suggest any type of wind velocity and direction estimation step. In view of this deficiency JP '993 fails to provide the advantages of the present invention wherein, with the wind velocity and direction information, a beneficial landing flight path can be determined. For instance, as illustrated in Figure 6, by aligning the flight path with the wind and knowing the wind velocity, the descending step can be carried out on the coordinates relative to moving air (see the discussion on page 11, lines 2-9). Moreover, Figure 9 illustrates a technique, which facilitates minimizing ground speed at the time of landing and the reduction of impact given to the payload, based on the information attained as to the wind effect.

In addition to there not being any discussion in the Office Action as to what represents the estimation step being carried out in the '993 reference (the above relied (i) and (ii) fail to include an estimation step), the Final Office Action fails to describe how the noted reference reads on many of the dependent claims (including those adding features that emphasize advantageous attributes of the present invention such as those described

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above).

In view of the foregoing, it is respectfully submitted that the JP '993 reference fails to disclose or suggest the originally claimed invention (hence, no claim amendments have been made) and confirmation for the same by way of a Notice of Allowance is earnestly solicited.


If any fees are due in connection with the filing of this Amendment, such as fees under 37 C.F.R. §§ 1.16 or 1.17, please charge the fees to our Deposit Account No. 02-4300.

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Respectfully submitted,

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